Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form

1. Applying for (select one):	☐ (a) Prop 13 Urban Water Conservation Capital Outlay Grant ☐ (b) Prop 13 Agricultural Water Conservation Capital Outlay Feasibility Study Grant ☒ (c) DWR Water Use Efficiency Project	
2. Principal applicant (Organization or affiliation):	Westside Resource Conservation District	
3. Project Title:	Integrated on-Farm Drainage Management Salt Concentrator for Improved System Management	
4. Person authorized to sign and submit proposal:	Name, title	Morris A. "Red Martin, Manager/Secretary/Treasurer
	Mailing address	P.O. Box 205 Five Points, CA 93624
	Telephone	559-227-2489
	Fax.	559-227-0215
	E-mail	redmartin@psnw.com
5. ~~Contact person (if different):~~ *Application prepared by:*	Name, title.	Eric Abrahamsen Provost & Pritchard Eng., Inc
	Mailing address.	286 W. Cromwell Ave. Fresno, CA 93711-6162
	Telephone	(559) 449-2700 ext. 141
	Fax.	(559) 449-2715
	E-mail	eabrahamsen@ppeng.com
6. Funds requested (dollar amount):		$199,829
7. Applicant funds pledged (dollar amount):		Funded previously: $375,720 To be funded: $28,208
8. Total project costs (dollar amount):		$603,758
9. Estimated total quantifiable project benefits (dollar amount): Percentage of benefit to be accrued by applicant:		$28,180 12%

Percentage of benefit to be accrued by CALFED or others:	88%

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form (continued)

10. Estimated annual amount of water to be saved (acre-feet): 373

Estimated total amount of water to be saved (acre-feet): 7460

Over ___ years 20

Estimated benefits to be realized in terms of water quality, instream flow, other: Not quantifiable

11. Duration of project (month/year to month/year): 10/2002 to 06/2003

12. State Assembly District where the project is to be conducted: State Assembly Dist. 30

13. State Senate District where the project is to be conducted: State Senate Dist. 16

14. Congressional district(s) where the project is to be conducted: U.S. Congress. Dist. 20

15. County where the project is to be conducted: Fresno

16. Date most recent Urban Water Management Plan submitted to the Department of Water Resources: Not Applicable

17. Type of applicant (select one):
Prop 13 Urban Grants and Prop 13 Agricultural Feasibility Study Grants:

☐ (a) city
☐ (b) county
☐ (c) city and county
☐ (d) joint power authority

(Resource Conservation District)

☒ (e) other political subdivision of the State, including public water district
☐ (f) incorporated mutual water company

DWR WUE Projects: the above entities (a) through (f) or:

☐ (g) investor-owned utility
☐ (h) non-profit organization
☐ (i) tribe
☐ (j) university
☐ (k) state agency
☐ (l) federal agency

18. Project focus:

☒ (a) agricultural
☐ (b) urban

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
A. Project Information Form (continued)

19. Project type (select one):
Prop 13 Urban Grant or Prop 13 Agricultural Feasibility Study Grant capital outlay project related to:

N/A

- ☐ (a) implementation of Urban Best Management Practices
- ☐ (b) implementation of Agricultural Efficient Water Management Practices
- ☐ (c) implementation of Quantifiable Objectives (include QO number(s)
- ☐ (d) other (specify)

DWR WUE Project related to:

Westlands Area (Sub-Region 14)) - -> Quantifiable Objectives 163 & 164

- ☐ (e) implementation of Urban Best Management Practices
- ☐ (f) implementation of Agricultural Efficient Water Management Practices
- ☒ (g) implementation of Quantifiable Objectives (include QO number(s))
- ☐ (h) innovative projects (initial investigation of new technologies, methodologies, approaches, or institutional frameworks)
- ☒ (i) research or pilot projects
- ☒ (j) education or public information programs
- ☐ (k) other (specify)

20. Do the actions in this proposal involve physical changes in land use, or potential future changes in land use?

- ☐ (a) yes
- ☒ (b) no

If yes, the applicant must complete the CALFED PSP Land Use Checklist found at http://calfed.water.ca.gov/environmental_docs.html and submit it with the proposal.

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One
B. Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form is authorized to submit the proposal on behalf of the applicant; and

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant.

_____	Morris A. “Red” Martin,_____	_____
Signature	Manager/Secretary/Treasurer	Date

Project Summary

The proposed project consists of the installation of additional components for the Demonstration Project on Agroforestry / Integrated on-Farm Drainage Management (IFDM) by Westside RCD in western Fresno County. The IFDM project involves the reuse of drainage water to produce crops with different salt tolerance, in order to reduce the volume of saline agricultural drainage water, such that salts impacts are minimized. This IFDM project at Red Rock Ranch has been in operation since 1991, demonstrating the effectiveness of such a system. It is a model of private and public entities working together investigating and attempting to solve the widespread problem of irrigated agriculture affected by a saline high water table. The following additional components are proposed for the IFDM project in order to continue the system operation and promote system management flexibility:

- A net-covered Salt Concentrator to store concentrated brine prior to sending the brine to the existing still
- An Enhanced Evaporation System ("Turbomist") to evaporate recycled drainage water when needed
- Replacement of the existing flood irrigation system with sprinklers for 14 acres of salt tolerant crops

In the past, the final disposal point from the IFDM system was a Solar Evaporator on open ground, which was regulated by the Regional Water Quality Control Board. At times Selenium levels in the standing water exceeded regulatory limits. More recently, Westside RCD obtained grant funds to construct a Solar Still as the final disposal point for the drainage water. With this still, "clean" water can be returned back to the farm and there is a greater potential for the harvesting of salts. For efficient management and future regulatory compliance, it has been determined that temporary storage of drainage water is needed to handle the winter groundwater flows up to 6 acre-feet. This storage is proposed to be the net-covered Salt Concentrator to prevent wildlife access to any high Selenium level water. Additional funding requested is for the Enhanced Evaporation System and sprinkler system, both for more effective applied water management.

The project is located within the boundaries of Sub-Region 14 (Westlands Area) as defined by the CALFED program. The purpose of the proposed project is to prevent seepage losses to a saline shallow groundwater table, and reduce nonproductive evapotranspiration through the recovery of drainage water. From the report *"Integrated System for Agricultural Drainage Management on Irrigated Farmland"* it is estimated that from the 620 irrigated acres of Red Rock Ranch, the IFDM project saves 373 acre-feet of water per year that would be lost to a salt sink. The project is consistent with the Sub-Region 14 Targeted Benefits:

> 163 - "Decrease flows to salt sinks to increase the water supply for beneficial uses"
> 164 – "Decrease nonproductive ET to increase water supply for beneficial uses"

The water saved gives a benefit of $28,180 per year and costs are estimated to be $228,037. **Figure 1 – Project Vicinity Map** shows the location of the Demonstration Project.

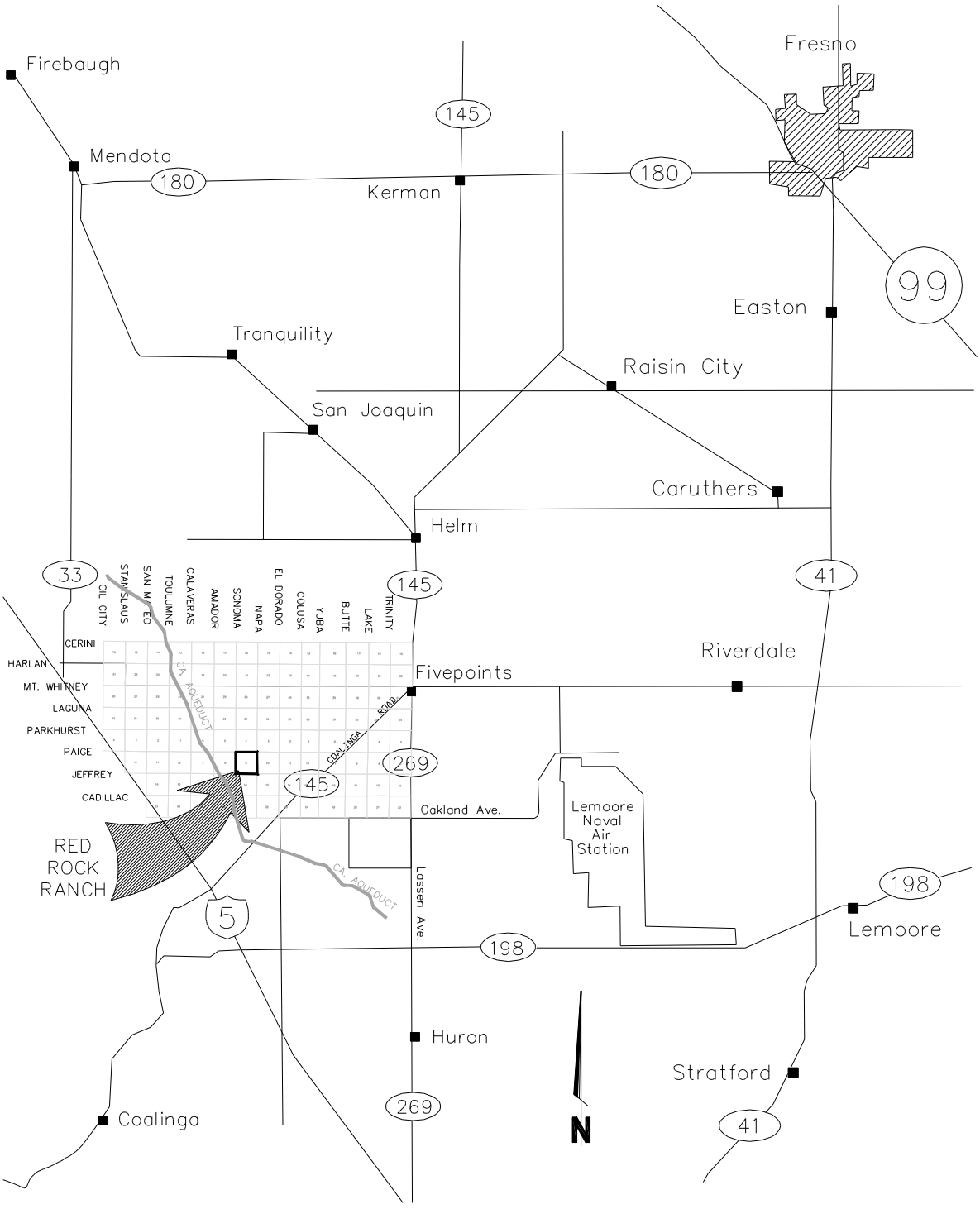


Figure 1 – Project Vicinity Map

Part 2-A
Scope of Work: Relevance and Importance

A-1: Nature, Scope and Objectives of the Project

The objective of the project is to prevent seepage losses to a salt sink (Quantifiable Objective 163). The main component of the proposed project, the Salt Concentrator, solar still, reclaims and recovers the final 10 percent of the drainage water produced from the IFDM Program. High-quality water is produced and salts and other naturally occurring elements are removed from the drainage water.

The water use efficiency objectives of this proposal are:

1. To demonstrate an integrated system for the management of irrigation and drainage waters, salts and selenium, enhanced by a solar distillation process to achieve up to 97 percent utilization of all water used on the farm and use of subsurface irrigation technology. The vast majority of the water – surface and drainage—is put to full beneficial use for the production of food and fiber crops, with a minor amount of drainage water ever leaving the farm (by evaporation).
2. To design, implement and operate an advanced irrigation/drainage water management system as a practical model for other growers and water/drainage districts to follow.
3. To monitor and analyze data on source control, water sequential reuse, salt and selenium removal, wildlife habitat and other system components.
4. To evaluate the interaction of food production and wildlife ecology within well-designed and managed operations on irrigated farmland.
5. Create a demonstration and educational project for the benefit of growers, water managers, administrators, students, political leaders and the public in California.

This proposed project hopes to build on the successes in efficient water use already quantified, meeting the CALFED Quantifiable Objectives 164 for Sub-Region 14: “Decrease nonproductive ET to increase water supply for beneficial uses.” The IFDM system increases the overall efficiency of water use. While conventional farming on 640 acres would require about 1,550 acre-feet of surface irrigation water, by reusing drainage water this IFDM system requires only about 1,215 acre-feet of irrigation water, a water saving of 24 percent. The sequential reuse of about 90 percent of drainage water to irrigate salt-tolerant crops contributes to this water conservation. The addition of subsurface irrigation technology and the recovery and reuse of the remaining 7 percent as distilled drainage water is expected to improve the overall efficiency.

The CALFED Agricultural Water Use Efficiency Program has developed a list of Quantifiable Objectives, which are CALFED’s estimates of the practical and cost-effective contribution agricultural water use efficiency can make towards goals related to water supply reliability, water quality, and ecosystem restoration. CALFED has completed 55 Quantifiable Objectives out of the 196 potential Quantifiable Objectives

that were identified for the 21 Sub-Regions in the Central Valley. This project is consistent with one of the Quantifiable Objectives that has been completed for Sub-Region 14, Number 164. The Intended Outcome of Quantifiable Objective Number 164 is to "decrease nonproductive ET to increase water supply for beneficial uses", with a quantifiable objective of less than 8,900 acre-feet per year. This project would save approximately 373 acre-feet of water annually that is lost to a salt sink, amounting to 4.2% of the identified Quantifiable Objective.

A-2: Background Information and Need for the Project

The Westside Resource Conservation District (Westside RCD) was established on February 12, 1984, pursuant to Division 9 of the California Public Resources Code, for the purpose of developing and expanding ongoing programs of soil and water conservation. The Westside RCD contains approximately 1,052,000 acres within its boundaries, beginning just south of the town of Mendota and extending south and east to just north of Kettleman City. The District lies in portions of western Fresno and Kings Counties with approximately 600,000 acres in the San Joaquin Valley being irrigated cropland, with the remaining portion rangeland in the Inner Coast range. The District is located within Sub-Region 14 as defined by the CALFED program. The California Aqueduct and Interstate 5 bisect the District diagonally. The primary source of water for growers within the District is from the California Aqueduct. The major crops grown within the District are cotton, garlic, almonds, fruit orchards, beans, vineyards, lettuce, onions, pistachios, pomegranates, safflower, tomatoes, wheat, and alfalfa.

A significant portion of land within the District is affected by saline shallow groundwater. Shallow groundwater in the area is high in salts and some other naturally occurring elements, including Boron and Selenium. Table 1 – Forecasts of Extent of Drainage Problem Area is from page 76 of *"A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley, September 1990"* (often referred to as the "Rainbow Report"). Said report forecasts the Westlands subarea drainage problem to the year 2000 as affecting 108,000 acres, and to 204,000 acres by year 2040.

Table 1
Forecasts of Extent of Drainage Problem Area

Subarea	year 2000	year 2040
Northern	34,000	44,000
Grasslands	116,000	207,000
Westlands	108,000	204,000
Tulare	125,000	348,000
Kern	61,000	148,000
TOTAL	446,000	953,040

On the other hand, the *October 1998 Westlands Subarea Report*, Figure 14 indicates an area of 199,300 acres in the Westlands Subarea with poor natural drainage or excessive salinity problems. Therefore, it is presumed that there is approximately 200,000 acres of drainage impacted lands within the Westlands area, the primary area of benefit for IFDM systems.

The aforementioned Westlands Subarea Report, Figure 12 Areas of Shallow Groundwater Map for April 1993 indicates the extent of shallow groundwater within the Westlands area. The area at Red Rock Ranch in shown as 0 to 5 feet depth to shallow groundwater.

The project is needed to conserve water and reduce losses to a salt sink. The proposed project will help meet CALFED goals of reducing pumping from the Delta by providing growers in Westside RCD with means to take delivery of more water during years of adequate supply and less reliance upon imported water during dry years.

The water savings from the reduction of nonproductive evapotranspiration (ET) and subsequent increase in supply for irrigation addresses the Quantifiable Objective 164 for this sub-region. In addition, the proposed project will address the CALFED Quantifiable Objective 163 for Sub-region 14 to decrease in-flows to salt sinks. Additionally, the Targeted Benefit Categories by Sub-Region apply to this proposed project, specifically focusing on the reduction of salinity and native constituents such as selenium, and sediment management through controlled irrigation-induced erosion.

Three of the four CALFED Bay-Delta Program objectives – ecosystem quality, water supply and water quality – can be met by implementation of the IFDM Program, including the components identified in this proposed project. In addition, the implementation of IFDM Programs in areas that presently drain into the San Joaquin River can help reduce the volume of drainage effluent entering the San Joaquin River, subsequently improving water quality.

The west side of the San Joaquin Valley is plagued with a build-up of salts, selenium, boron and other naturally occurring elements. Dense soil and shallow clay layers cause the build-up of these salts and other elements by preventing unused irrigation water from percolating into the deep aquifer. Without natural drainage, the agricultural productivity of the region has been diminished and water quality and ecosystems are at risk. As the saline drainage water encroaches into the crop root zone, crop yields are reduced, crop choices are limited, and over time, crop production is eliminated altogether. Likewise, water quality and the Sacramento-San Joaquin Bay-Delta estuary ecosystem are impacted by the build-up of salts, selenium and other elements.

Since 1985, several water and resource management agencies have been developing an integrated on-farm drainage management program (IFDM). The IFDM Program evolved from the agroforestry concept and was developed by the Westside Resource Conservation District, California Department of Water Resources,

California Department of Food and Agriculture, USDA-Natural Resource Conservation Service, California State University, Fresno and University of California, Davis. The Regional Water Quality Control Board and U.S. Fish and Wildlife Service also have participated.

Red Rock Ranch owner John Diener and other growers in the WRCD have played a leading role in the development of the IFDM Program. A professional staff of several government agencies, universities, and consultants provide the required technical assistance. Public and private funding has implemented the project.

Interest in the IFDM Program has been widespread. There presently are six IFDM projects being considered in drainage-impacted areas on the west side and in Kern County. Likewise, farmers and water districts in the Grasslands Drainage Basin have expressed interest in developing IFDM Programs to help reduce selenium load levels and drainage effluent in their discharge outlets. The IFDM Program offers benefits to water managers, growers and political leaders by providing a practical example of integrated farming and engineering methods to protect the quality of rivers, groundwater resources, soils and the environment. The continued research and practical on-farm applications conducted at Red Rock Ranch as identified in this proposal will improve the applicability of this program to other drainage-impacted areas.

The IFDM Program and the specific components of this proposal are consistent with local and regional water and drainage management plans. The Federal-State Interagency San Joaquin Valley Drainage Program's final report, *A Management Plan For Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley*, recommends several measures for managing subsurface agricultural drainage, which are employed in the IFDM Program. The major components include source control (water conservation practices), sequential reuse of drainage water and the treatment and/or disposal of drainage water. The proposal is an essential part of the implementation strategy as developed by the San Joaquin Valley Drainage Program.

The IFDM Program manages_____
_____
___om the Red Rock Ranch IFDM Program, such as salt and semay um inflows, in the future w ater volumes and quality, level of water tables, soil chresources rather than waste or ecological problems. The initial system concept is shown below in **Figure 2 – IFDM Concept Diagram**.

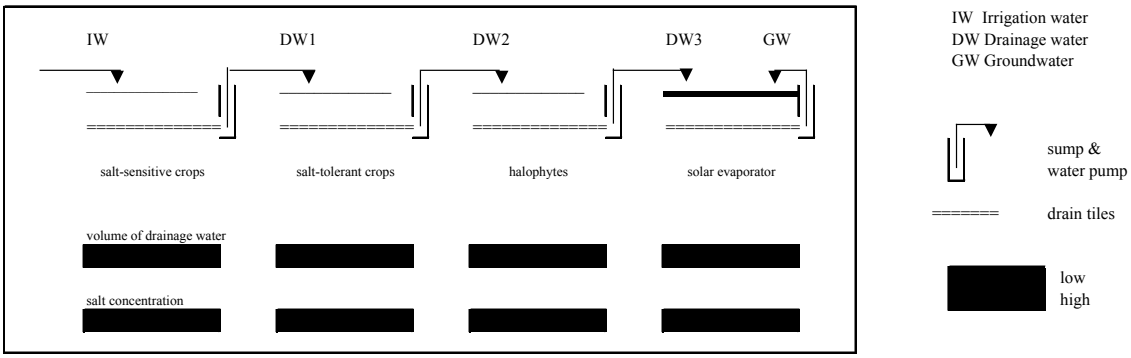


Figure 2 – IFDM Concept Diagram

Figure 3 – Red Rock Ranch IFDM Layout shows the original system layout at Red Rock Ranch.

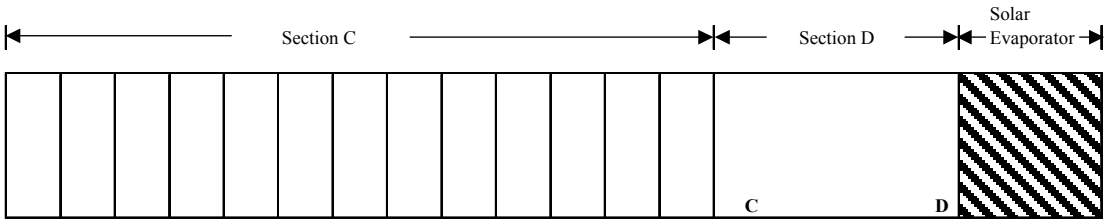
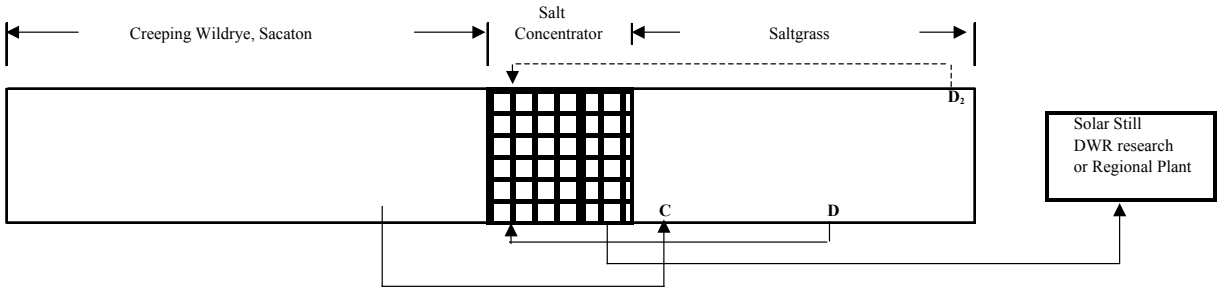


Figure 3 – Red Rock Ranch IFDM Layout

The project operated with the design shown in **Figure 3** for almost 5 years. Problems were encountered throughout this time period with Selenium levels exceeding the regulatory limits within standing water. In order to comply with regulatory requirements, the project facilities needed to be modified, while adhering to the original IFDM concept. This initially caused the Westside RCD to construct a Solar Still in calendar year 2000 to be the end of the system. It has also caused Westside RCD to consider a net-covered storage area, or Salt Concentrator, for storage of drainage water that is unable to be accessed by wildlife due to the netting over it. With this system, when Selenium levels are lower, the water can still be applied to crops needing irrigation water or to a smaller Solar Evaporator with the Enhanced Evaporation System (a Turbomist nozzle application) when the storage area is full and Selenium levels are under regulatory limits. The currently proposed modifications to the Red Rock Ranch IFDM system are shown in **Figure 4 – Possible IFDM Layout at**



Red Rock Ranch.

Figure 4 – Possible IFDM Layout at Red Rock Ranch

This modified IFDM system components are what is being requested for funding in this grant proposal. In order to continue the operation of the Red Rock Ranch IFDM project, changes are required for continued operation. The sprinkler system will allow water to be applied more uniformly to existing crops with less chance of ponding water. The net-covered Salt Concentrator will prevent wildlife access to the drainage water and provide needed storage for winter groundwater flows. The Turbomist equipment will allow a smaller Solar Evaporator to be operated when Selenium levels are under regulatory limits.

Part 2-B
Scope of Work: Technical / Scientific Merit, Feasibility, Monitoring & Assessment

B-1: Methods, Procedures and Facilities

The proposed additional components of the IFDM project (Salt Concentrator, Enhanced Evaporation System, & sprinkler system) increases management flexibility to the existing IFDM project, meeting Objective 164 for Sub-Region 14 by reducing nonproductive evapotranspiration and subsequent increase in supply for irrigation, and Objective 163 by decreasing flows to salt sinks.

A solar distillation process will be used to achieve up to 97 percent utilization of all surface and drainage water on-farm. The IFDM Program now uses about 90 percent of the drainage water to produce salt-tolerant crops, grasses and halophytes. An opportunity exists to recover almost an additional 7 percent of drainage water that was formerly discharged into the solar evaporator. Instead of discharging into an open system -- the solar evaporator -- a closed system solar distillation system will help to reclaim an additional 7 percent of drainage water. The distilled water will result in high-quality water for agricultural, municipal or industrial uses. In order to effectively reclaim the additional percentage of drainage water, greater management flexibility must be obtained for the project operator. Hence the need to a Salt Concentrator, Enhanced Evaporation System, and sprinkler system requested for funding.

In addition to the CALFED Targeted Objectives, the project meets some of the Efficient Water Management Practices identified by the Agricultural Water Management Council. These are as follows:

1. Facilitate Alternative Land Use – prior to the IFDM system, the land was gradually not being farmed
2. Facilitate use of available recycled water that otherwise would not be used beneficially, .., and does not cause harm to crops or soils
3. Facilitate the financing of capital improvements for on-farm irrigation systems

B-2: Schedule

Once a contract is executed, the proposed project is anticipated to take up to 9 months to complete. The major tasks are Project Design, Environmental and Regulatory Compliance, and Project Construction. Since funding is presently not authorized for any current Water Use Efficiency proposals, it is estimated from the proposal solicitation package that grant commitments will be made by April 15, 2002. The proposed timeline is as follows:

	04/15/02	Applicants notified if projects selected for grants
	10/01/02	Contracts executed with selected applicants
10/01/02 to	01/01/03	Project Design

10/01/02 to 04/01/03 Environmental and Regulatory Compliance
04/01/03 to 06/30/03 Project Construction

B-3: Monitoring and Assessment

The progress towards Quantifiable Objective #163 (decreased flows to salt sinks) will be measured by monitoring the inflow and outflow of saline water, and each point along the IFDM project. See Figure for location of project facilities. Progress toward Quantifiable Objective #163 will be measured quarterly and if appropriate monthly, and compared to baseline numbers prior to adding the new components to the IFDM project. Presently the Department of Water Resources, San Joaquin Field Office is monitoring groundwater conditions, movement of subsurface drainage water, applied water, water quality, chemical constituents, and weather data. They spend nearly $100,000 on monitoring for scientific assessment and education, which has also been used for regulatory reporting requirements.

Once construction is completed on the proposed additions to the IFDM project, the water savings will begin as soon as the project is complete. During the construction phase of the project, construction review will occur to document compliance with the plans and specifications. After construction is complete, a direct measurement of the water savings will be possible. The landowner is committed to long term operation and study of the project site.

Part 2-C
Qualifications of the Applicants and Cooperators

C-1: Resume of Project Manager

The project manager and the contact person for the applicant, Westside RCD, will be the Manager/Secretary/Treasurer of the District, Morris A. “Red” Martin. Westside RCD will obtain technical project oversight from staff at the Department of Water Resources San Joaquin Field Office in Fresno. Engineering design services may be obtained from local consultants, like Provost & Pritchard Engineering Group, Inc., of Fresno, CA as needed. Mr. Martin’s resume is included in the Appendix.

C-2: External Cooperators

Several external cooperators will be involved in the proposed project. The California Department of Water Resources will provide technical expertise to the Westside RCD in development, operations and evaluation of the project. The USDA Natural Resources Conservation Service will provide technical assistance to the District and will help disseminate project results to growers. The U.S. Fish and Wildlife Service will assist in providing environmental and wildlife safety evaluations. The California Department of Food and Agriculture will help in disseminating project results to growers. The project will be done with close coordination with the Regional Water

Quality Control Board. These agencies have been involved in the development of the IFDM project at Red Rock Ranch since its inception in 1991. It is anticipated that a construction contract will be awarded after a competitive bidding process.

Part 2-D
Benefits and Costs

D-1: Budget Breakdown and Justification

The preliminary engineer's cost estimate for construction of additional project components to the Red Rock Ranch IFDM system, is included below in **Table 2 – Preliminary Engineer's Cost Estimate (Capital Outlay)** is based on recent construction projects in the area, including the typical contingency of 15% which has been added to address unknown costs.

Table 2 – Preliminary Engineer's Cost Estimate (Capital Outlay Costs)

Item	Quantity	Units	Unit Cost	Total Cost
Earthwork	10,000	CY	$ 2.50	$ 25,000
Salt Concentrator with Netting Cover	2.5	Ac	10,000	25,000
10-inch Piping	1,200	LF	10	12,000
4-inch Piping	750	LF	5	3,750
Pumping Plant & Appurtenances	3	Ea.	10,000	30,000
Enhanced Evaporative System (Turbomist)	1	LS	20,000	20,000
Solid-set Sprinklers	14	Ac	1,500	21,000
Concrete Structures/Sumps	2	Ea.	12,500	25,000
Subtotal				$ 136,750
Contingency - 15%				$ 20,513
Total Capital Outlay Costs				**$ 157,263**

The total estimated capital outlay is $157, 263.

D-2: Cost-Sharing

The total project cost is estimated at $ 603,758, in-kind contribution of $403,928, including $375,720 for the IFDM system for which Westside RCD has previously paid. The local benefit for the current phase of the project is $28,180 and the request for CALFED funding is $199,829. A detailed budget summary and breakdown is shown in **Table 3 – Project Detailed Budget Summary.** Therefore Westside RCD is willing to pay the local benefit amount of $28,208.

Insert Table 3 – Project Detailed Budget Summary

D-3: Benefit Summary and Breakdown

The project has direct benefits to Westside RCD as part of the IFDM project and indirect benefits to the CALFED program and other water users. The Westside RCD will directly benefit primarily from Water Conservation due to the project:

Water Conservation: The 373 AF per year of water conserved (386 AF minus evaporation while water is in holding pond) has an estimated value of approximately $75.55 per acre-foot, which is the basic cost of service for Westlands Water District water. The water conservation benefit Westside RCD at Red Rock Ranch is therefore estimated to be $28,180 per year (373 AF/yr x $75.55/AF = $28,180).

Benefits to the CALFED program and other water users are indirect benefits and are difficult to quantify. The proposed project increases the water supply for beneficial use by growers in Westside RCD. This in turn reduces the landowner's needs for transfers and supplemental water purchases, including Article 21 (Interruptible) water deliveries and Turnback water purchases. By reducing the amount of transfers and supplemental water purchases, water can be left in the system for use by the CALFED program or other water users.

D-4: Assessment of Costs and Benefits

The costs of the project are estimated to be $603,758 as set forth in **Table 3 – Project Detailed Budget Summary**, with $228,037 being the present project costs. The direct benefits to Westside RCD includes a water conservation benefit estimated to total approximately $28,180 per year as explained in said Table. The Westside RCD is willing to cost share in the amount of $28,208. The costs and benefits of the proposed project are summarized below:

PROJECT COSTS & BENEFITS SUMMARY

Costs	CALFED grant amount	$ 199,829
	Local cost share amount	28,208
	Subtotal	$ 228,037
	Local cost share previously funded	$ 375,720
	Total Project Cost	$ 603,758
Quantified Benefits		
	Water Conservation	$ 28,180/yr

Non-quantified Benefits

- Increase the water supply for beneficial uses by CALFED or others.
- Reduced salt loading to the groundwater table.
- Information transfer to approximately 200,000 acres of land.
- Economic benefit to community because of construction project.
- Education of other participants.

- Farmland that is not presently in production due to saline soil/groundwater problems could possibly be reclaimed and placed in production.

The project proposal will allow the presented technology to be transferred to approximately 200,000 acres (the approximate area of the Westlands drainage problem area) of drainage-impacted land. Based on the experience at Red Rock Ranch of 640 acres of land applying 1215 AF instead of 1601 AF (2.5 AF/acre) approximately 24.1 %, or 386 AF of applied water goes to drainage and is reused. Of this approximately 13 AF is calculated to be lost to evaporation during the time it sits in the Salt Concentrator. Therefore, 373 AF per 620 farmable acres of land (0.6 AF/acre) could be saved from being lost to a salt sink. If this was applied to the entire Westlands area, there is the potential for 0.6 AF/Ac x 200,000 acres or 120,300 AF per year at a value of $75/AF, or up to $9 million per year.

Part 2-E
Outreach, Community Involvement and Acceptance

E-1: Outreach Efforts & Benefits to Disadvantaged Communities

The IFDM Program can provide benefits to people in rural communities by helping sustain the local farm economy by providing a management alternative to the retirement of drainage-impacted farmland. Farms that go out of production resulting from drainage-induced problems and/or chronic water shortages can create serious economic impacts to local rural communities.

Westside towns, like Mendota and Firebaugh, already are plagued with unemployment due to the seasonal nature of agriculture. Unemployment has increased on the westside resulting from water shortages, cropping changes from salinity problems and the fallowing of drainage-impacted lands. Likewise, the decline in productivity from salinity and water shortages has created hardships for local school districts, which have seen a decline in enrollment due to the reduction in farm worker jobs.

Furthermore, the technologies employed in this proposed project can help create new diversified career opportunities through the construction new technologies. The possible commercial and industrial uses from the salt by-products can create a new value-added industry for the region, which is seeking to diversify its agricultural employment base.

There are no known tribal entities in the Five Points area, so there is no opportunity to involve and extend the benefits of the project to tribal entities.

E-2: Training, Employment and Capacity Building Potential

The five-year IFDM Program at Red Rock Ranch has demonstrated that the use of IFDM on a larger scale is possible and practical. Several farms and water districts

are in the initial stages of implementing IFDM Programs on the west side. In fact, four courses on developing an IFDM Program were held in 1999 with over 150 farmers, technicians and professionals attending.

The merits of the IFDM Program have been recognized by the U.S. Environmental Protection Agency and State Water Resources Control Board. The WRCD received a Clean Water Act Section 319(h) Grant for $350,000 from the State Water Resources Control Board to educate farmers and provide a certification program to train professionals on implementing IFDM systems. The Grant will target the needs of the farm owners, water/drainage district managers, engineers and technical professionals. For his pioneering work in the IFDM systems, John Diener received Governor's Environmental and Economic Leadership Award in 1999, and the Irrigator of the Year Award from CSU, Fresno in 1998 and *The California Vegetable Journal*.

The certification program for IFDM will be developed to train individuals in the environmental management and specific engineering, hydrologic and agronomic techniques necessary to develop a successful IFDM Program, utilizing new technologies developed by this proposed project. Technical and educational experts within several government agencies, universities and consulting organizations will assist in the development of this Certification Program. The government agencies will include the USDA-NRCS, California DWR, California Department of Food and Agriculture, Regional Water Quality Control Board and the U.S. Fish and Wildlife Service. Certified professionals will be trained in CEQA and permitting requirements for IFDM systems including the information needs to apply for waste discharge requirements.

It is anticipated that the project will be constructed by a qualified contractor after a competitive bidding process. The number of people that will be employed by the contractor and his subcontractors is not known at this time. It is possible that the contractor and associated subcontractors will have apprentices on the job site that will receive training, however, the amount of training that will occur is unknown at this time.

E-2: Notification of Proposal / Acceptance

Westside RCD has discussed the project with the major landowners in the District, whom are supporting of the project. Westside RCD has contacted multiple individuals and agencies about the proposal to add components to the existing IFDM project. Letters of support are included in the Appendix from the following:

1. Grassland Basin Drainers
2. West Hills Community College District, Coalinga Campus, Farm of the Future
3. US Bureau of Reclamation, San Joaquin Drainage Division
4. Department of Water Resources, San Joaquin District Office
5. I-5 Business Development Corridor, Inc.

Copies of letters supporting the Westside RCD 2001 Water Use Efficiency grant application are also included from the Fresno County Farm Bureau and the Office of Congressman Calvin Dooley. Had these individuals been contacted, the applicant is confident that they would also have supported this grant proposal by Westside RCD

It is anticipated that the Westside RCD will be notifying the Regional Water Quality Control Board of the proposal since implementation of the proposal components will most likely require Regional Board involvement.

E-4: Disseminating Information

Funds from the Section 319(h) grant will be used to develop an education and outreach program, including tours of the IDFM Program at Red Rock Ranch, development of a model design of halophyte areas and solar evaporators, identification of salt-tolerant plant materials, and evaluation of water conservation and the balance of salt and selenium in these projects. Additional outreach efforts include meetings with small groups of growers in salinity and selenium-impacted areas, track IFDM programs in western San Joaquin Valley, the development of a guide/handbook for the implementation of IFDM programs for the landowners and farm managers, and distribution of the guide/hand book. The Community Alliance with Family Farmers (CAFF) along with other established educational and industry organizations will be used to distribute information to the landowners in the affected areas. Researchers from the U.C. Cooperative Extension Service, University of California, Davis and California State University, Fresno will also participate in the outreach program.

The education and outreach program is essential for achieving the environmental and economic benefits of IFDM Program. The desired outcome of this proposed project is to have trained professionals to assist farmers and landowners in the development of IFDM Programs throughout all salinity/drainage-impacted areas throughout California and the western United States.

It is anticipated that an article or articles about the project would be written for publication in the District's newsletter "The Westside Resource" with is distributed to many landowners on the westside and other individuals.

References

Cervinka, V. et. al, October 1999. Integrated System for Agricultural Drainage Management on Irrigated Farmland – Grant 4FG2011920, US Department of the Interior, Bureau of Reclamation.

US Department of the Interior and California Resources Agency, September 1990. A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley, Final Report of the San Joaquin Valley Drainage Program.

Westlands Water District, October 1998. Westlands Subarea Report for the San Joaquin Valley Drainage Implementation Program.

Resumes

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Letters of Support

Part One

Part Two

Water Use Efficiency
Engineer's Estimate of Probable Cost

Item	Quanity	Units	Unit Cost	Total Cost
Earthwork	10,000	CY	$ 2.50	$ 25,000
Salt Concentrator Netting/Cover	2.5	Ac	10,000	25,000
10-inch Piping	1,200	LF	10	12,000
4-inch Piping	750	LF	5	3,750
Pumping Plant & Appurtenances	3	Ea.	10,000	30,000
Enhanced Evaporative System (Turbomist)	1	LS	20,000	20,000
Solid-set Sprinklers	14	Ac	1,500	21,000
Concrete Structures/Sumps	2	Ea.	12,500	25,000
Subtotal				$ 136,750
Contingency - 15%				$ 20,513
Total Capital Outlay Costs				**$ 157,263**

Table 3
Project Detailed Budget Summary

Water Use Efficiency Program: Salt Concentrator & Enhanced Evaporation System
Drainage Water Recovery (97 Percent Efficient) with Salt Harvesting

Item	Quantity	Units	Unit Cost	Total Cost	Local Cost Share	CALFED WUE PSP Request	Life (years)	Annual Cost @ 6% discount rate 1/
Land Purchase / Easement 2/	0	Acres	$ 0	$ 0	$ 0	$ 0	50	$ 0
Planning/Design/Engineering	1	L.S.	15,000	15,000	0	15,000	20	1,308
Materials/Installation 4/	1	L.S.	136,750	136,750	6,350	130,400	20	11,922
Structures 4/	2	Ea.	12,500	25,000	0	25,000	20	2,180
Equipment Purchases/Rentals	0	Ea.	0	0	0	0	20	0
Environmental Mitigation/Enhancment (CEQA docs)	1	Ea.	6,000	6,000	6,000 5/	0	20	523
Construction Administration/Overhead	260	Hours	40	10,400	0 5/	10,400	20	907
Project/Legal/License Fees (WDRs, etc.)	1	Ea.	7,500	7,500	7,500	0	20	654
Contingency (up to 15%) 3/	1	Ea.	22,388	22,388	3,358	19,029	20	1,952
Other: Existing IFDM system installation 2/	620	Acres	606	375,720	375,720	0	20	32,757
Other: Educational Field Day	1	Ea.	5,000	5,000	5,000	0	20	436
Totals				$ 603,758	$ 403,928	$ 199,829		$ 52,638

Direct Quantifiable Benefits				Annual Benefits
Water reclaimed (and prevented from flowing to salt sink)6/	373	Acre-Feet	$ 75.55	$ 28,180

Benefit/Cost Ratio	0.5

1/ At a 6% interest rate for a 20 year life, Equivalent Uniform Annual Cost factor = 0.0872
2/ IFDM system previously paid for
3/ Standard contingency for unexpected construction and other costs, applied only to future Materials/Installation and Structures costs
4/ See Engineer's Cost Estimate for additional detail
5/ Work performed by DWR
6/ Based on a total amount of drainage of 24.1% of 1600 AF (i.e. 2.5 AF/ac. applied to 640 ac.) minus Apr.-Sept. evap. from 2.5 ac. holding pond = (1600 AF * 0.241) - (62"/12"/ft * 2.5 ac)
7/ Basic cost of service for Westlands WD contract water (2001/02)